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IS 6320 (1985): Power Thresher, Hammer-mill Type [FAD 21: Farm Implements and Machinery]



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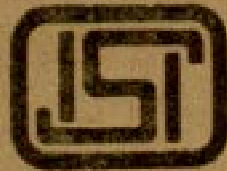
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Indian Standard

SPECIFICATION FOR
POWER THRESHER, HAMMER-MILL TYPE
(*First Revision*)

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INDIAN STANDARDS INSTITUTION
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Indian Standard

SPECIFICATION FOR POWER THRESHER, HAMMER-MILL TYPE (*First Revision*)

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IS : 6320 - 1985

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Indian Standard
SPECIFICATION FOR
POWER THRESHER, HAMMER-MILL TYPE
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 25 February 1985, after the draft finalized by the Harvesting and Threshing Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Separation of grains by treading has been the traditional method for threshing of crops from very early times. Since the output by this method is low and the cost of operation is high, the power threshers are now being extensively used and are replacing traditional method of threshing the crop.

0.3 This standard was first published in 1971 incorporating performance and other requirements of this type of power thresher. However, certain problems were faced in implementing this standard particularly the characteristics to be tested during routine testing. A need was, therefore felt to revise this standard to make it more implementable and up to date with respect to safety provisions.

0.4 The figures given in this standard are only for illustration and should not be considered as suggestive of any standard design.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the material, constructional, performance and other requirements of power thresher, hammer-mill type.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 6284-1985* shall apply.

3. MATERIALS

3.1 The materials used for various parts (see Fig. 1) shall be as given in col 3 of Table 1. The material may conform to standards given in col 4 of Table 1. The material for components shall be declared by the manufacturer.

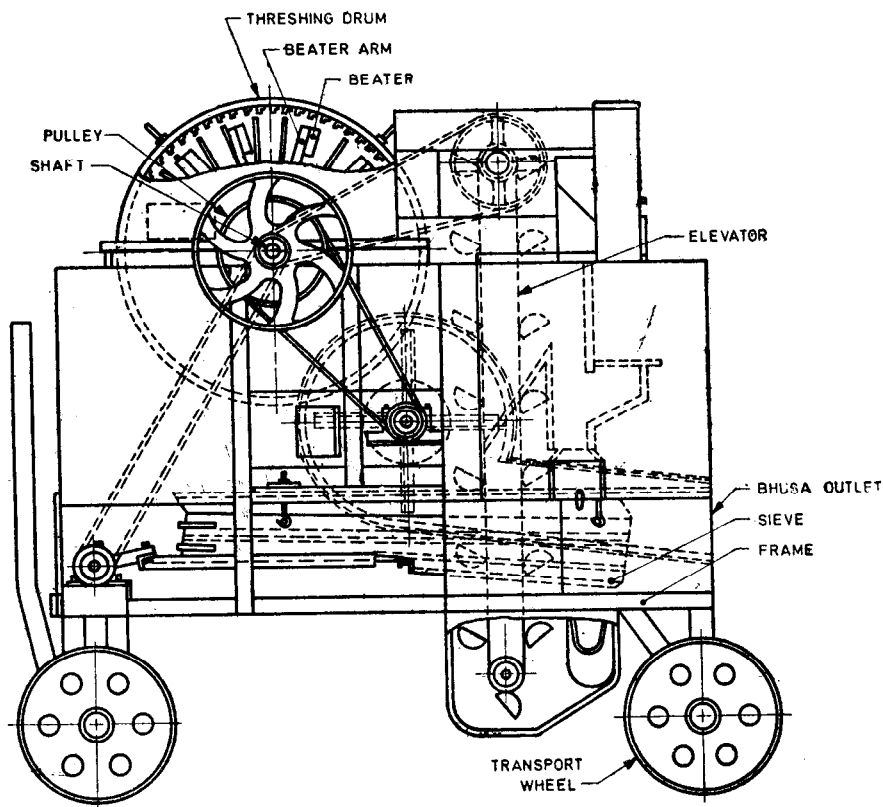


FIG. 1 TYPICAL ASSEMBLY OF POWER THRESHER

*Test code for stationary power thresher for wheat (second revision).

**TABLE 1 MATERIALS USED FOR VARIOUS PARTS
OF POWER THRESHER**

(Clause 3.1)

SL No.	NAME OF PART	MATERIAL	REF TO INDIAN STANDARD
(1)	(2)	(3)	(4)
i)	Frame	Mild steel	IS : 226-1975* or IS : 1977-1975†
ii)	Shaft		
iii)	Concave		
iv)	Threshing drum		
v)	Blower		
vi)	Sieve		
vii)	Beater arm	Cast iron	IS : 210-1978‡
viii)	Fly wheel		
ix)	Pulley		
x)	Transport wheel	Mild steel	{ IS : 226-1975* or IS : 1977-1975†
xi)	Beater	Carbon steel	IS : 2591-1969§
		Mild steel	{ IS : 226-1975* or IS : 1977-1975†

NOTE — The material for those components, not specified in the table, shall be declared by the manufacturer.

*Specification for structural steel (standard quality) (*fifth revision*).

†Specification for structural steel (ordinary quality) (*second revision*).

‡Specification for gray iron castings (*third revision*).

§Specification for hot rolled bars for threaded components (*first revision*).

4. CONSTRUCTION

4.1 Frame — The construction of the frame shall be rigid and strong.

4.2 Transport Wheel — The minimum diameter of the wheel shall be 350 mm and its minimum width shall be 60 mm.

4.3 Feeding Systems — The feeding system in the thresher shall be of chute or hopper or conveyor. The requirement of the system used in the thresher shall be as given in IS : 9129-1979*.

4.4 Threshing Drum — The drum shall be made in two round halves. Projections shall be rigidly fixed laterally and radially. Provision for easy replacement of these projections should be preferred.

4.5 Beater Arm and Beaters — Beater arm shall be rigidly fixed to a hub mounted on main shaft. Beaters shall be attached with beater arm at the tip (see Fig. 2).

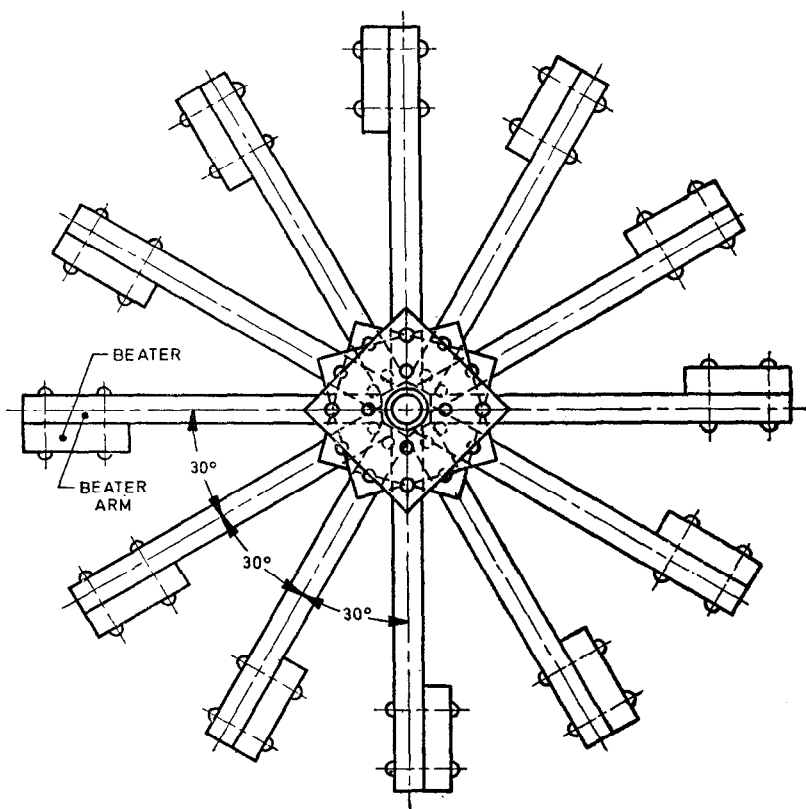


FIG. 2 ASSEMBLY OF BEATER BAR WITH 12 BEATERS

*Technical requirement for safe feeding systems for power thresher.

4.6 Sieves — At least two sieves shall be used. Sieves shall be capable of easy cleaning and replacement.

4.7 Blower — The blower may be centrifugal straight blade type with a suitable arrangement for controlling air blast.

4.8 Shaker — The crank may be mounted on shaft and it shall be adjustable.

5. PERFORMANCE REQUIREMENTS

5.1 When tested in accordance with the method given in 7.1 of IS : 6284-1985*, the power required at no-load shall be not more than 15 percent of the rated power of the thresher.

5.1.1 During the no-load run, the visual observations shall not indicate the following:

- a) Presence of any marked oscillation during operation,
- b) Presence of undue knocking or rattling sound,
- c) Frequent slippage of belts,
- d) Non-smooth running of shafts in their respective bearings,
- e) Any marked unusual wear or slackness in any components,
- f) Any marked rise in bearing temperature,
- g) Vibration in blower running, and
- h) Any development of crack in welded or fabricated components.

5.2 When tested in accordance with the method given in 8.1 of IS : 6284-1985*, the thresher shall meet the requirements given in Table 2.

5.2.1 During and after the test according to 5.2, the visual observations shall not indicate the following:

- a) Observations given under 5.1.1 (a) to (h),
- b) Frequent clogging of threshing unit,
- c) Frequent clogging of sieve apertures,
- d) Non-smooth flowing of material through different components,
- e) Frequent clogging of grain in elevator unit, and
- f) Frequent loosening of fasteners.

*Test code for stationary power thresher for wheat (*second revision*).

**TABLE 2 PERFORMANCE REQUIREMENTS OF POWER THRESHER,
HAMMER-MILL TYPE FOR DIFFERENT CROPS**

(Clause 5.2)

SL No.	CROP	INPUT CAPACITY (kg OF CROP PER kWh ENERGY CONSUMED)	THRESHING EFFICIENCY (PERCENT)	CLEANING EFFICIENCY (PERCENT)	TOTAL LOSS (PERCENT)
		<i>Min</i>	<i>Min</i>	<i>Min</i>	<i>Max</i>
(1)	(2)	(3)	(4)	(5)	(6)
i)	Wheat	85	99	96	5
ii)	Paddy	90	99	98	5
iii)	Jowar	60	95	93	5
iv)	Pearl millet	70	95	93	5

NOTE — Cracked grains in total loss (see col 6) shall be not more than 2 percent.

5.3 When tested in accordance with **8.2** of IS : 6284-1985*, no break down shall occur in threshing unit, cleaning unit, elevating unit, body, etc.

6. OTHER REQUIREMENTS

6.1 The thresher shall meet the requirements given in **4** (except **4.17**) and **5** of IS : 9020-1979†.

7. MARKING AND PACKING

7.1 Marking — Marking on the threshers shall be done in accordance with **7.1** and **7.2** of IS : 9020-1979† and IS : 10618-1983‡.

7.1.1 Power thresher may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Test code for stationary power thresher for wheat (second revision).

†Safety requirements for power threshers.

‡Pictorial representation for cautionary notices for power threshers.

7.2 Packing — The packing of the power thresher or its different assemblies shall be done in accordance with the agreement between the purchaser and the supplier.

8. SAMPLING AND TEST

8.1 At least one thresher of a production model shall be tested under type testing for all the requirements of this specification.

8.2 Each thresher shall be tested under routine testing for the following:

- a) Requirements given under 5.1, 5.1.1 and 7.1; and
- b) Dimensional measurements of the characteristics given in Appendix A and comparing the values with those which were obtained for thresher type tested.

8.3 For lot acceptance the method of sampling and criteria of conformity shall be as agreed to between the purchaser and the supplier (*see* 3 of IS : 7201-1974*).

A P P E N D I X A

[*Clause 8.2 (b)*]

DIMENSIONAL AND OTHER CHECKS TO BE MADE DURING THE ROUTINE TESTS

A-1. DIMENSIONS OF THRESHING UNIT

- a) Diameter of the beater assembly
- b) Number and size of beater (length, width and thickness)
- c) Method of fixing beaters on beater arm
- d) Axial and radial clearances between threshing drum projections and the beater
- e) Range of radial clearance between threshing beater and concave
- f) Size of threshing drum shaft
- g) Concave:
 - 1) Shape and size of bar
 - 2) Length of concave
 - 3) Number of opening
 - 4) Size of opening

*Method of sampling of agricultural machinery and tractors.

A-2. FEEDING SYSTEMS

A-3. CLEANING AND SEPARATING UNIT

- a) Number and type of sieve
- b) Size of sieve opening
- c) Number of holes per cm^2 area
- d) Total and effective area of each sieve
- e) Range of angle adjustment of sieve
- f) Range of stroke length
- g) Sieve clearance
- h) Size of blower
 - 1) Diameter
 - 2) Length and width of plates
 - 3) Range of adjustment of controlling air blast
 - 4) Size of inlet and outlet opening

A-4. ELEVATING UNIT

- a) Type of elevator
- b) Size, number and pitch of buckets (if bucket type)

A-5. FLY WHEEL

- a) Size (diameter and thickness)
- b) Mass

A-6. TRANSMISSION

- a) Type of drive
- b) Size of belt and pulley:
 - 1) For threshing drum
 - 2) Blower
 - 3) Elevator
 - 4) Sieve shaker

A-7. TRANSPORT UNIT

- a) Size of hitch frame
- b) Type and size of transport wheel

A-8. OVERALL DIMENSIONS

- a) Height
- b) Width
- c) Length

A-9. TOTAL MASS

A-10. TYPE, NUMBER AND LOCATION OF LUBRICATION POINTS

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1 \text{ N} = 1 \text{ kg.m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s (s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$



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